



US009409624B2

(12) **United States Patent**
Nishimoto et al.

(10) **Patent No.:** **US 9,409,624 B2**
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **BICYCLE SPROCKET**

(71) Applicant: **SHIMANO INC.**, Sakai (JP)

(72) Inventors: **Yusuke Nishimoto**, Sakai (JP); **Atsuhiko Emura**, Sakai (JP)

(73) Assignee: **SHIMANO INC.**, Sakai (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 284 days.

(21) Appl. No.: **14/250,721**

(22) Filed: **Apr. 11, 2014**

(65) **Prior Publication Data**

US 2015/0291255 A1 Oct. 15, 2015

(51) **Int. Cl.**
B62M 9/10 (2006.01)
B62M 9/06 (2006.01)

(52) **U.S. Cl.**
CPC **B62M 9/105** (2013.01); **B62M 9/06** (2013.01)

(58) **Field of Classification Search**
CPC B62M 9/06; B62M 9/105; B62M 9/10
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

591,270 A 10/1897 Gauthier
593,714 A 11/1897 Baldwin

619,537 A 2/1899 Bufford
3,709,053 A * 1/1973 Ohshita B62M 9/105
474/156
5,226,857 A * 7/1993 Ono F16G 13/06
474/231
2013/0139642 A1 6/2013 Reiter et al.
2015/0191214 A1* 7/2015 Emura B62M 3/00
74/594.2

FOREIGN PATENT DOCUMENTS

DE 102007049880 4/2009

* cited by examiner

Primary Examiner — William E Dondero

Assistant Examiner — Robert T Reese

(74) *Attorney, Agent, or Firm* — Mori & Ward, LLP

(57) **ABSTRACT**

A bicycle sprocket comprises sprocket teeth. The sprocket teeth include a first tooth and a second tooth. The first tooth has a chain-engaging axial width which is larger than a first distance defined between opposed inner link plates of a bicycle chain and which is smaller than a second distance defined between opposed outer link plates of the bicycle chain. The second tooth has a chain-engaging axial width which is larger than the first distance and which is smaller than the second distance. The first tooth and the second tooth are spaced apart from each other in a circumferential direction of the bicycle sprocket to define a space which is free of a tooth configured to engage with the bicycle chain.

20 Claims, 16 Drawing Sheets

